Claims

I claim:

1. A diamond, comprising a natural red type Ia diamond with stable NV color centers absorbing in the 400-to-640 nm range and imparting a red color to said diamond, said diamond being produced from the following:

   (a) a natural near-colorless-to-brown type Ia diamond containing A centers by means of HPHT-treating said diamond in a high-pressure apparatus at a temperature exceeding 2150^0C and under a stabilizing pressure of 6.0-7.0 GPa, irradiating said diamond with $5{\cdot}10^{15}$-$5{\cdot}10^{18}$cm^{-2} 2-4 MeV electrons and finally annealing said diamond in a vacuum at a temperature exceeding 1100^0C.

   (b) a natural near-colorless high-nitrogenous type Ia diamond containing over 800 ppm of nitrogen in the form of A and B1 centers by means of irradiating said diamond with high-energy electrons with the irradiation dose over 10^{19} cm^{-2} and annealing said diamond at a temperature exceeding 1100^0C.

2. A technique of producing a diamond of claim 1, comprising the steps of:

   (a) using a natural near-colorless-to-brown type Ia diamond containing A centers,

   (b) subjecting said diamond to HPHT-treatment in a high-pressure apparatus at a temperature exceeding 2150^0C and under a stabilizing pressure of 6.0-7.0 GPa, to cause A center dissociation and C center formation in said diamond,

   (c) irradiating said diamond with $5{\cdot}10^{15}$-$5{\cdot}10^{18}$cm^{-2} 2-4 MeV electrons to produce a large number of vacancies in said diamond,

   (d) annealing said diamond in a vacuum at a temperature exceeding 1100^0C, at which vacancies migrate and get trapped at C centers to form stable NV color centers, whereby said diamond has stable NV centers absorbing in the 400-to-640 nm range and imparting a red color to said diamond.

3. A technique of producing a diamond of claim 1, comprising the steps of:

   (a) using a natural near-colorless high-nitrogenous type Ia diamond containing over 800 ppm of nitrogen in the form of A and B1 centers,

   (b) irradiating said diamond with high-energy electrons with the irradiation dose over 10^{19} cm^{-2} to produce interstitial nitrogen atoms and vacancies in said diamond,

   (c) annealing said diamond at a temperature exceeding 1100^0C, at which interstitial nitrogen atoms annihilate with vacancies to form C centers and then the newly formed C centers capture more vacancies to form stable NV color centers, whereby said diamond has stable NV centers absorbing in the 400-to-640 nm range and imparting a red color to said diamond.